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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,509	03/01/2004	Manish K. Ahluwalia	200315654-1	1055

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HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER
LI, ZHUO H

ART UNIT	PAPER NUMBER
2185	

NOTIFICATION DATE	DELIVERY MODE
01/28/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JERRY.SHORMA@HP.COM
mkraft@hp.com
ipa.mail@hp.com

	Application No.	Applicant(s)
Office Action Summary	10/790,509	AHLUWALIA, MANISH K.
	Examiner	**Art Unit**	
	Zhuo H. Li	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *12 December 2007*.

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-23* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in

37 CFR 1.17(e), was filed in this application after final rejection. Since this application is

eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e)

has been timely paid, the finality of the previous Office action has been withdrawn pursuant to

37 CFR 1.114. Applicant's submission filed on 12/12/2007 has been entered.

Response to Amendment

2.   This Office action is in response to amendment field 12/11/2007.

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

4.   Claim 23 is rejected under 35 U.S.C. 101 because the claimed invention is directed to

non-statutory subject matter.

Claim 23 is not limited to tangible embodiments. In view of Applicant's disclosure, in

Specification (Pp [0024]), the term "a computer readable medium having a program" is not

limited to tangible embodiments (e.g., the computer readable medium include an electronic

circuit, a semiconductor memory device, a ROM, a flash memory, an erasable ROM (EROM), a

floppy diskette, a compact disk CD-ROM, an optical disk, a hard disk, a fiber optic medium, a

radio frequency (RF) link), and intangible embodiment (e.g., the program or code segments can

be stored in a computer/processor readable medium or transmitted by a computer data signal

embodied in a carrier wave, or a signal modulated by a carrier, over a transmission medium, a

computer readable medium may include any medium that can store or transfer information, i.e.,

software which can transfer signal defined above as carrier waves, and the computer data signal

may include any signal that can propagate, i.e., propagate is merely a signal or carrier waves,

over a transmission medium such as electronic network channels, optical fibers, air,

electromagnetic, RF links, etc., i.e., software). As such, the claim is not limited to statutory

subject matter and is therefore non-statutory.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   Claims 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Armilli et al.

(US PAT. 6,907,494 hereinafter Armilli).

Regarding claim 13, Armilli discloses a computer device (8, figure 3) comprising a processor (10, figure 3), a memory (22, figure 3) coupled to the processor via a system bus (12, figure 3), the memory including program instructions for maintaining a virtual memory data structure as part of a memory management system, i.e., program provided an address translation mechanism that translates virtual addresses to physical addresses (col. 5 lines 5-53), and means for unmapping a virtual address space, i.e., processor's move engine (28, figure 3), for a process in a manner which does not violate semantics for an operating system of the computing device when a removable memory mappable device associated with the process is logically disconnected (abstract and col. 7 line 32 through col. 9 line 10, i.e., the processor's move engine works in conjunction with the associated mapping engine to take the associated memory module offline, read as unmapping a virtual address space, prior to its physically removal, read as when the removable memory mappable device associated with the process is logically disconnected, such that the memory module can be removed in physical memory without the operating system having to direct and control the reconfiguration of physical memory to accomplish the physical memory chance, read as for a process in a manner which does not violate semantics for an operating system of the computing device).

Regarding claim 14, Arimilli discloses the program instructions execute to dereference the virtual address space for the process (col. 7 line 43 through col. 8 line 8 line 50, i.e., to perform memory reconfiguration in response to memory module M2 being removed from data processing system).

Regarding claim 15, Arimilli discloses the means for unmapping the virtual address space includes program instructions, which execute to maintain a representation of an object associated

with the process in the virtual memory data structure of the process (col. 8 line 51 through col. 9

line 10, i.e., creating a virtualized physical mapping from the addressable read address space

being utilized by operating system into a virtual physical address space).

Regarding claim 16, Browning discloses the means for unmapping the virtual address

space includes program instructions which execute to remove a mapping of the object to physical

memory (col. 7 lines 43-47).

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.   Claims 1-12 and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over

(US PAT. 6,907,494 hereinafter Armilli) in view of Dirks (US PAT. 6,119,214).

Regarding claim 1, Armilli discloses a computer device (8, figure 3) comprising a

processor (10, figure 3), a memory (22, figure 3) coupled to the processor via the system bus (12,

figure 3), and program instructions provided to the memory and executable by the processor to

track a virtual address space for a process associated with a device connected to the computer

device (figure 2 and col. 5 line 66 through col. 6 line 39), and release a physical address space

associated with the virtual address space when the device has a connection removed from the

computer device (col. 7 lines 32-57). Although Armilli teaches to register that the virtual address

space before when the process has released the virtual address space (col. 7 lines 32-42), Armilli differs from the claimed invention in not specifically teaching to register that the virtual address space, previously available to the process, is no longer valid for process use subsequent to when the physical address space is released. However, Dirks teaches a method of allocation of address space in a virtual memory system by determining whether the virtual address space associated with those entries previously available to the process is no longer in use subsequent to when the entries can be removed or released (abstract and col. 5 line 60 through col. 6 line 55). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Arimilli to register that the virtual address space, previously available to the process, is no longer valid for process use subsequent to when the physical address space is released, as per teaching of Dirks, in order to allow new address ranges to be allocated and de-allocated in a small amount of time.

Regarding claims 2-3, Arimilli discloses the device includes a device, i.e., mapping engine (26, figure 3), which can be mapped to memory, and the virtual address space includes an input/output space (col. 7 lines 58-65).

Regarding claim 4, Arimilli discloses the program instructions are part of a memory management system, which includes a virtual memory data structure associated with the process (col. 6 line 66 through col. 7 line 15).

Regarding claim 5, Arimilli discloses the program instructions execute to register the virtual address space is no longer valid for process use in the virtual memory data structure associated with the process (col. 8 lines 9-26).

Regarding claim 6, Arimilli discloses the program instructions execute to allocate the virtual address space when the process requests physical memory (col. 8 line 51 through col. 9 line 10).

Regarding claim 7, Arimilli discloses the program instructions execute to register that the virtual address space is available for use when the process releases the virtual address space (col. 7 lines 32-57).

Regarding claim 8, Arimilli discloses a computing device (8, figure 3) comprising a processor (10, figure 3), a random access memory (22, figure 3) coupled to the processor via the system bus (12, figure 3), and program instructions provided to the memory and executable by the processor to deference a virtual address space for a process associated with a removable memory mappable device connected to the computer system (figure 2 and col. 5 line 66 through col. 6 line 39), and release a physical address space associated with the virtual address space when the device has a connection removed from the computer device (col. 7 lines 32-57). Although Armilli teaches to register that the virtual address space before when the process has released the virtual address space (col. 7 lines 32-42), Armilli differs from the claimed invention in not specifically teaching to register that the virtual address space, previously available to the process, is no longer valid for process use subsequent to when the physical address space is released. However, Dirks teaches a method of allocation of address space in a virtual memory system by determining whether the virtual address space associated with those entries previously available to the process is no longer in use subsequent to when the entries can be removed or released (abstract and col. 5 line 60 through col. 6 line 55). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify

Arimilli to register that the virtual address space, previously available to the process, is no longer

valid for process use subsequent to when the physical address space is released, as per teaching

of Dirks, in order to allow new address ranges to be allocated and deallocated in a small amount

of time.

Regarding claim 9, Arimilli discloses the program instructions execute to unmap the

virtual address space in a manner which do not violate semantics for an operating system of the

computing device (abstract and col. 11 lines 6-26).

Regarding claim 10, Arimilli differs from the claimed invention in not specifically

teaches the operating system is selected from the group of a Unix operating system and a Linux

operating system. However, it is old and notoriously well know in the art that kernel is a core of

an operating system, a portion of the system that manages memory, files, and peripheral devices,

maintains the time and data, launches applications, and allocates system resources, as defined by

Microsoft Computer dictionary Fifth edition, furthermore, kernel is defined as an operating

system of the essential part of Unix or other operating systems, such as Linus operating system

in *On-line Computing Dictionary*

(http://www.instantweb.com/foldoc/foldoc.cgi?query=kernel&action=Search). Therefore, it

would have been obvious to a person of ordinary skill in the art at the time the invention was

made to modify the operating system in the computer system of Arimilli is selected from the

group of a Unix operating system and a Linux operating system, because it improves and

enhances the flexibility in the computer system.

Regarding claims 11-12, Arimilli discloses the program instructions execute to allow the

process to unmap the virtual address space subsequent to the release of the physical address

space and to indicate an operation as failed if the process attempts to perform the operation

subsequent to registering that the virtual address space is no longer valid for process use (col. 7

lines 17-42).

Regarding claims 17-18, Arimilli discloses the means for unmapping the virtual address

space includes program instructions which execute to register in the virtual memory data

structure of the process that the virtual address space associated with the process is not available

for use (col. 8 lines 9-26), and the program instructions execute to set a bit in the region of the

virtual memory data structure to indicate that the virtual address space is not available for use

(col. 7 lines 43-57). Arimilli differs from the claimed invention in not specifically teaching to

register the virtual space including program instructions which executed to register in the virtual

memory data structure of process that the virtual address space associated with the process is not

available for use subsequent to when the mapping of the object to physical memory has been

removed. However, Dirks teaches a method of allocation of address space in a virtual memory

system by determining whether the virtual address space associated with those entries previously

available to the process is no longer in use subsequent to when the entries can be removed or

released (abstract and col. 5 line 60 through col. 6 line 55). Therefore, it would have been

obvious to a person of ordinary skill in the art at the time the invention was made to modify

Arimilli to register the virtual space including program instructions which executed to register in

the virtual memory data structure of process that the virtual address space associated with the

process is not available for use subsequent to when the mapping of the object to physical

memory has been removed, as per teaching of Dirks, in order to allow new address ranges to be

allocated and de-allocated in a small amount of time.

Regarding claim 19, the limitations of the claim are rejected as the same reasons as set forth in claim 8.

Regarding claims 20-21, the limitations of the claims are rejected as the same reasons set forth in claims 11-12.

Regarding claim 22, the limitations of the claim are rejected as the same reasons as set forth in claim 1.

Regarding claim 23, the limitations of the claim are rejected as the same reasons set forth in claim 19.

Response to Arguments

9.   Applicant's arguments with respect to claims 1-12 and 17-23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhuo H. Li whose telephone number is 571-272-4183. The examiner can normally be reached on Mon - Fri 10:00am - 6:30pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on 571-272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11.   Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Zhuo H. Li

Patent Examiner
January 18, 2008

SANJIV SHAH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100